

## DOCUMENT DELIVERY SYSTEM FACILITATING AGGREGATION OF PERIODIC CONTENT

### RELATED INVENTIONS

- 5           The present invention is a continuation-in-part of U.S. Application No. 09/325,040 filed on June 7, 1999 titled *Document Delivery System for Automatically Printing a Document on a Printing Device*, by Brewster, et al.

### TECHNICAL FIELD

- 10           This invention generally relates to the printing field and, more particularly, to a document delivery system facilitating aggregation of periodic content.

### BACKGROUND

- 15           In the mid-1400's, Johann Gutenberg revolutionized how information is disseminated through his invention of the movable type press. With the publication of the Mazarin Bible, documents which were once held in the exclusive domain of a chosen few were now widely available to the masses. Nearly 550 years later, the mass media revolution that Gutenberg started is alive and well, complete with newspapers such as the New York Times and the Washington Post, magazines such as  
20   Newsweek and Sports Illustrated, and literally thousands upon thousands of other publications.

- While these thousands of publications cover a wide range of interests, from news to sports to fashion to model rocketry, they have one thing in common: they are intended to be read by a mass market. Unlike the pre-Gutenberg days, where a  
25   document would literally be read by only one person of a very small number of people, it is not economically viable for today's publications to have such a small readership, due at least in part to high marketing, production and distribution costs. In fact, many of today's publications are funded to a very large extent by the advertising contained within them. These advertisers are attracted to publications that can  
30   consistently deliver a large, reliable audience of consumers that will be exposed to their advertising.

While this mass-market publication model has worked well for hundreds of years, it is not without its problems. One such problem is that a typical reader of a publication has a wide variety of interests, and no single mass market publication will be able to satisfy all of these interests. For example, a reader who is interested in international news, golf, fly-fishing, Genealogy, and computers may have to subscribe to several different publications to satisfy these interests. Of course, since these publications are intended for the mass market, they will also contain a significant amount of material that our reader is not interested in and will not read. It goes without saying that if there is a significant amount of material a reader isn't reading, there is a significant amount of advertising that the reader isn't reading either – as well as a significant amount of paper that is wasted. Advertisers know this, and agree to pay considerably less to a mass market magazine or newspaper per 1000 exposures to their ad than they would pay to a direct-mail generator that can provide a more specific guarantee that the people exposed to their ad are of a demographic group that will be much more likely to read and be receptive to their ad.

In addition, it is neither cost-effective nor time effective for most readers to subscribe to and/or read a large number of publications. Generally, the typical reader will only subscribe to a few publications that are of the most interest to them. The reduced readership level of the publications our typical reader chooses not to subscribe to, even though she might be interested in at least some of the editorial and advertising content contained inside, means that the publication receives less subscription and advertising revenue than they otherwise would. If many other readers make the same decision, the continued health of the publication may be in jeopardy, and the publication may be forced out of business. In fact, many publications do go out of business yearly for failing to attract a sustaining number of advertisers and readers – even if there are a large number of readers that would be interested in reading their publication, and a corresponding number of advertisers anxious to have these readers exposed to their ads. In general, publications that fail to attract a substantial mass market of people willing to pay for and/or read them cease publication. This is a shame, since many of these publications would enrich the diversity of information available to all readers, and would provide an avenue for lesser known writers and artists to practice their wares.

In more recent years, a new type of publication has emerged: the electronic publication. Readers of these publications typically sign into the Internet through their computer, and read the publications online. Some of these publications, such as CNN.com and pointcast.com, allow users to state personal preference(s) on what type of material they would like to read. Often, these personalized publications include advertising, usually in the form of a banner ad that is placed on or along a periphery of the visual display (top, bottom, side, etc.).

While these electronic publications have been an interesting development in the distribution of information, they still represent only a tiny fraction of the information that is published under the more traditional post-Gutenberg model. Many readers of these electronic publications complain that they are very difficult to read (on the video display), especially for long periods of time. While it might be convenient for a reader to sign onto the Internet to look at the CNN.com web site for a brief summary of late breaking news, this reader would most likely only spend a few minutes at the site, and would likely still subscribe to the more traditional print media such as Newsweek or the Washington Post. They would also likely spend significantly more time reading the more traditional printed publication than they would spend reading the electronic publication, and correspondingly, spend more time being exposed to the ads in the traditional printed publication. Accordingly, printed publications continue to flourish today – more than five centuries after Gutenberg made them possible – and after more than a decade after the innovation of the electronic publication.

While these printed publications have certainly benefited modern society, no significant attempt has been made thus far to solve the underlying problems with these publications discussed above. Just such a solution is provided herein.

## SUMMARY

In accordance with the teachings of the present invention, a document delivery system for automatically printing a document on a printing device is presented. More specifically, in accordance with one aspect of the invention, a document server is presented comprising a user profile, established by a user requesting delivery of content from one or more content providers on a periodic basis, and an edit module.

- The edit module, responsive to the user profile, periodically receives content from solicited content providers in accordance with a content provider publication schedule, and aggregates the received content for periodic delivery to a requesting user when the content provider's publication schedule deviates from a delivery schedule defined in the user profile.

#### BRIEF DESCRIPTION OF THE DRAWINGS

- Fig. 1** shows a block diagram of a document delivery system of one embodiment of the invention;
- Figs. 2-4** illustrate flow charts detailing the operation of the transmission module and the printing module of the document delivery system of one embodiment of the invention;
- Fig. 5** illustrates how user profile information is acquired from a user in one embodiment of the invention;
- Fig. 6** shows how user profile information is acquired from a user in one embodiment of the invention;
- Fig. 7** shows a print schedule for the delivery of documents in one embodiment of the invention;
- Fig. 8** shows how the print schedule of Fig. 7 can be modified by the user;
- Figs. 9A-9B** shows a document printed by the printing device according to one embodiment of the invention;
- Fig. 10** shows a document printed by the printing device according to one embodiment of the invention;
- Figs. 11A-11D** show a document printed by the printing device according to one embodiment of the invention;
- Fig. 12** shows a document printed by the printing device according to one embodiment of the invention;
- Fig. 13** illustrates a block diagram of an example print manager, according to one embodiment of the present invention;
- Fig. 14** is a flow chart of an example method of generating and delivering a personalized publication, in accordance with another aspect of the present invention;

**Fig. 15** graphically illustrates an example form requesting aggregated delivery of periodic content, according to one example embodiment;

**Figs. 16A and B** graphically illustrate an example delivery list segment of a user profile, according to one example embodiment; and

5 **Fig. 17** illustrates an example publication of aggregated content, according to one embodiment of the present invention.

#### DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

**Fig. 1** illustrates a block diagram of a document delivery system of one  
10 embodiment of the invention. Document delivery system 10 contains document server 100. In the preferred embodiment, document server 100 is operatively coupled via network 200 to a variety of personal computers, printing devices, and other electronic devices, collectively referred to devices 300. Document server 100 contains edit module 120, transmission module 150 and knowledge module 170. Edit  
15 module 120 receives inputs from one or more content providers 50, and/or one or more advertising providers 80. Distribution module 400 is operatively coupled to document server 100. In a preferred embodiment, document server 100 is a minicomputer/server, such as an HP 9000 server sold by the Hewlett-Packard Company, although those skilled in the art will appreciate that document server 100  
20 could be any type of other computing or electronic device(s) that performs the functions described herein and still fall within the spirit and scope of the invention. Network 200 is preferably the Internet, although an Intranet, local area network, or other type of public or private network, either wired (e.g., telephone, cable TV, etc.) or wireless (e.g., satellite, radio, cell phone, etc.), could also or additionally be used.

25 Devices 300 are shown in Fig. 1 as being capable of being configured in a wide variety of ways. For example, personal computer 310 is shown connected to printing device 320, which prints document 10320 for user 20320. Personal computer 310 is operatively coupled to network 200. In contrast, printing device 330, which prints document 10330 for user 20330, is operatively coupled to network 200 without  
30 an intervening personal computer or other electronic device. Printing device 350, which prints document 10350 for user 20350, is shown connected to electronic device 340, which could be a set top box, television set, palmtop personal digital assistant

(PDA) or other type of electronic device that is operatively coupled to network 200.

Finally, printing device 370, which prints document 10370 for user 20370, is connected to electronic device 360, which is operatively connected to network 200.

The printing devices shown in Fig. 1 could be printers, such as the HP DeskJet 890

- 5 printer, HP LaserJet V printer, or other models of printers manufactured by HP or others; so-called "mopiers" or other multi-function printing devices that can print, fax, scan, and/or copy, or any other device capable of transferring information to a printable media such as plain paper, specialty paper, transparencies, or other media capable of tangibly receiving such information and which can be easily carried about
- 10 by the user.

According to one aspect of the present invention, document delivery system 100 includes an innovative printing module 380 and a transmission module 150. Transmission module is preferably located with document server 100. As Fig. 1 shows, printing module 380 could be located in any of the devices 300, such as in

15 personal computer 310, printing device 330, or electronic device 340, operatively coupled via network 200 to document server 100, or it could be located within document server 100 itself, such as in knowledge module 170. According to one embodiment of the invention, transmission module 150 and printing module 380 represent software functions that execute on suitably programmed microprocessor(s)

20 within a device 300 and/or document server 100. It will be appreciated, however, that special purpose hardware or other mechanisms could be employed to implement the innovative features and functions described below.

Turning briefly to Fig. 13, a block diagram of an example printing module 380 is presented, according to one embodiment of the invention. According to one

25 embodiment, to be described more fully below, printing module 380 resides within one or more of devices 300 and, in response to user interaction with a user interface (not shown), schedules and manages the delivery of one or more documents to a printing device. Any of a number of user interfaces may be used to utilize the features and functions of printing module 380. According to a preferred embodiment, to be

30 described more fully below, a web page is projected to a device 300 by document server 100, content provider 50 and/or advertisers 80, wherein the web page includes

one or more iconic function calls to one or more of the features/functions provided by printing module 380.

As shown in Fig. 13, printing module 380 includes one or more controller(s) 402, a print function 404, a scheduler function 406, a document translation/interpretation function 408, a memory/storage system 410, an input/output (I/O) interface 412, and optionally one or more applications 413, each coupled as shown. It will be appreciated that, although denoted as separate functional blocks, one or more elements 402-413 may well be combined without deviating from the spirit and scope of the present invention. Moreover, although depicted in accordance with a hardware paradigm, those skilled in the art will appreciate that printing module 380 and its associated elements 402-413 may well be embodied as a series of executable instructions which, when executed by a host processor of devices 300, implement the features and functions of printing module 380 to be discussed below. In this regard, Fig. 13 is merely illustrative of the scope and spirit of the claimed invention.

As shown, controller(s) 402 selectively invoke one or more functions 404-408 and/or applications 413 in response to user interaction with a user interface, e.g., a web page. According to one embodiment, the user interface includes iconic selectors, e.g., buttons, which when selected by the user causes controller 402 to selectively invoke an instance of a function associated with the selector. In this regard, controller 402 communicates with external elements via input/output (I/O) interface(s) 412. In an alternate embodiment, controller 402 provides a user with a user interface from applications 413.

As used herein, I/O interface(s) 412 are intended to include one or more of any of a number of communication interfaces known in the art including, but not limited to, a direct connect communication interface (e.g., a serial interface, a parallel interface, a Universal Serial Bus (USB), an Advanced Graphic Port (AGP), etc.), a local area network interface (e.g., an Ethernet interface, a Token Ring interface, etc.), or a wide area network interface. In this regard, printing module 380 may communicate with any of a number of external and remote devices using an appropriate one of a plurality of wired and/or wireless I/O interfaces 413.

Automated print function 404 is selectively invoked by controller 402 in response to a user indication to immediately print a document (e.g., within the next several seconds) without first viewing or displaying the document. According to one embodiment, a user interface projected by printing module 380 or from an external source (e.g., document server 100) includes an iconic selector associated with one or more documents to invoke the automated print function 404 to print the one or more documents. Insofar as selection of the iconic selector associated with the one or more documents automatically causes the documents to be queued for printing (e.g., within the subsequent several seconds), the iconic selector is referred to herein as an “automated print” icon, or an “instant print” icon.

When the automated print icon associated with one or more documents is selected by a user, the user interface provides controller 402 with information regarding the associated one or more documents. According to one implementation, user interface provides controller 402 with a name/identifier and storage location of the one or more documents. Controller 402 provides the name/identifier and location information to automated print function 404 to queue the document for printing. As will be described in more detail below, automated print function generates and issues a request to retrieve the identified document(s) from the identified storage location via I/O interface 412. The retrieved documents are stored in memory locations 414A, 414B, etc. of memory 410. Once retrieved, document translation/interpretation function 408 is selectively invoked to interpret/translate and print the retrieved document. According to one implementation, the retrieved documents are queued and printed substantially instantaneously (e.g., within the subsequent several seconds). In alternate embodiments, the retrieved document(s) are printed according to a print schedule defined by the user.

According to one aspect of the invention, to be described more fully below, the document associated with an iconic selector is retrieved from a provider into memory 410 of print module 380 and immediately printed without invoking an application associated with the document. That is, translation/interpretation function 408 reads the stored document(s), interprets the textual, image, formatting, etc. content of the document(s) to print the document on an operatively coupled printer without having



to invoke the application associated with the retrieved document(s), and without having to display the document(s) to the user prior to printing.

In an alternate embodiment, an application 413 (e.g., Microsoft Word, Adobe Acrobat, etc.) associated with the document is invoked by controller 402 to print the document, but neither the document nor the application 413 are displayed to the user so, from the user's perspective, the application is not launched. In either case, automated print function 404 enables a user to immediately print a remote document without having to manually download, launch and print the document, thereby providing the user with the convenience and selection of electronic publications, with the physical reading experience introduced by the Gutenberg press.

The scheduling function 406 enables a user to establish a print schedule 390 for documents of interest. According to one embodiment of the present invention, scheduling function 406 is selectively invoked by controller 402 in response to a user's indication to add the document to a print schedule 390. As shown in Fig. 1, the printing schedule 390 may be located in devices 300, document server 100 or any other accessible location.

Turning to Figs. 2-4, flowcharts detailing the operation of transmission module 150 and a first mode of operation of printing module 380 are presented, according to one embodiment of the invention. In Figs. 2-4, the flow diagram shown in the left column is executed by transmission module 150 of document server 100, and the flow diagram in the right column is executed by printing module 380.

Referring now to Fig. 2, the flow diagram for transmission module 150 starts in block 1000, and the flow diagram for printing module 380 starts in block 2000. Since there is a great deal of interaction between these two flow diagrams, as represented by dashed lines connecting the two columns, the operation of the two flow diagrams will be described simultaneously.

In block 2100, user profile data is sent to document server 100 to be stored in the user profile. This user profile data can take on many different forms, from simple to very detailed. Fig. 5 shows a very simply acquisition of user profile data, such as that used in HP's Instant Delivery Program, the first version of which was generally available to the public less than one year from the filing date of this patent application. In this program, only three pieces of information are stored in the user

profile: type of printer, email address, and whether HP can contact the user. Fig. 6 shows a more complicated user profile than that currently used in HP's Instant Delivery Program, which includes the user's name, email address, company name, city, state, country, zip or postal code, phone number, printer information, and areas of interest. Those skilled in the art will appreciate that more or less user profile data from those shown in Figs. 5 and 6 could be sent to transmission module 150 in block 2100 and still fall within the spirit and scope of the invention, and that at least some of this information could come from a source other than a user. For example, the user profile data could also include household income, age, and sex of the user, among other things. In any event, block 1100 receives the user profile data sent by block 2100. Block 1200 stores the user profile data, preferably in knowledge module 170. Alternately, the user profile data could be stored in device 300 or in some other local or remote location.

Block 2200 checks to see whether a document should be received from document server 100. This is done by checking print schedule 390 which is preferably stored on a device 300 or document server 100, but may be stored in some other local or remote location. Printing schedule 930 preferably contains information that can be used to determine when documents should be printed by the printing device, such as upon document creation, user requested time, lapse of specified time period, and/or occurrence of one or more external events (e.g., a stock price or index reaching a specified value, a final score of a sporting event, etc.). Printing schedule 390 may be associated with an individual user, a device or a group of users and/or devices. In addition, each entry of printing schedule 390 could result in the printing of one or more documents.

Fig. 7 shows one example of printing schedule 390, of the type that might be used in an enhanced version of HP's Instant Delivery program. In this example, the title of delivery, delivery schedule, next delivery data and time, and the last deliver status are shown. Preferably, the user can select what time a document should be printed, whether it should be printed on a specific day of the week or month, weekdays, or weekends, and whether the printing schedule should expire after a specific period of time or continue indefinitely.

Referring again to Fig. 2, printing module 380 monitors printing schedule 390 to see if a document should be requested from document server 100 or from another source. When block 2200 determines that a document should be requested from document server 100 or from another source, block 2200 is answered affirmatively, and block 2300 automatically requests the document without user intervention from server 100 or from another source, as will be described in greater detail below. Note that if printing module 380 is located on device 300, block 2200 operates in a “pull” mode – where the document is “pulled” from document server 100 or another source to device 300. However, if printing module 380 is located remotely from device 300, such as in document server 100, block 2200 operates in a “push” mode – where the document is “pushed” from document server 100 or another source to device 300. If block 2300 determines that the document is located on document server 100 or at another source accessible via network 200, and if device 300 is currently in a disconnected state where it is not operatively coupled to the network 200, block 2300 will sign on to or otherwise enter a connected state with network 200, so that device 300 is operatively coupled to network 200.

Meanwhile, block 1300 checks to see if a document has been requested from printing module 380 in block 2300. Once it determines that such a document has been requested, block 1400 generates the document for printing module 380. Block 1500 then sends the document to printing module 380. Block 2400 checks to see whether a document has been received from document server 100 via block 1500. Once such a document has been received, block 2500 automatically prints the document, without user intervention, on a printing device. The term “without user intervention” means that a user is not directly involved in the printing operation; the document is sent automatically to a device 300 to be printed out by a printing device. According to this mode of operation, the user does not press “any” print buttons or otherwise be directly involved in the printing process; in fact, the user may not even be present in the same room, city, state, or country as device 300 during the printing operation. The printing operation automatically occurs in an unattended state – regardless of whether the user is present or not. In addition, if print schedule 390 is stored in a device-independent manner, such as on document server 100, a travelling

user could “log in” to document server 100 and have his or her customized document sent to a device 300 that is convenient to the user’s current location.

Referring now to Fig. 3, block 2600 checks to see whether the document printed successfully. If not, block 2800 performs error handling, such as attempting to print the document again, notifying the user that the printing device is out of paper or has some other error condition, or simply deciding not to print the document. When the document prints successfully, block 2900 informs document server 100 that the document printed successfully. Block 1600 waits for an indication from printing module 380 that the document did print successfully. When such an indication is received, block 1700 updates the user profile with this information.

It will be appreciated that not all of the blocks in Figs. 2-4 need be implemented, or implemented according to the order denoted, to fall within the spirit and scope of the present invention. More specifically, according to one implementation, flow of control moves from block 2600 to block 4100 of Fig. 4, as will be discussed later, and from block 1500 back to block 1300 of Fig. 2.

An alternate embodiment has been contemplated where other information is transmitted back to document server 100 in block 2900 to update the user profile preferably stored in knowledge module 170. This other information could be ink usage (total usage or usage broken out by ink color), printable media usage (number of pages printed, type of media used, etc.), or other types of information. In addition, another alternate embodiment has been contemplated where some or all of the information contained in the user profile stored in knowledge module 170 came from a source other than the user via printing module 380. For example, publicly or privately available information about the user, and/or the devices 300 he/she/they use, could be acquired from a wide variety of different sources and inserted into the user profile preferably stored in knowledge module 170.

Block 1800 examines the user profile preferably stored in knowledge module 170 to determine whether a product subsidy should be provide to the user. For example, if the information in the user profile indicates that this user has printed off his 1000<sup>th</sup> document, such as a “preferred” document that contains advertising from advertising providers 80 or is otherwise under the control of edit module 120, providing a product subsidy to the user may be warranted. For purposes of this

invention, a “product subsidy” could be a print consumable or other product. A “print consumable” is an inkjet cartridge for an inkjet printer, ink for such an inkjet cartridge, a toner cartridge for a laser printer, toner for such a toner cartridge, or any other product or substance that is depleted when a document gets printed, including printer ribbons, etc. Note that the “ink” referred to above would typically be of a permanent variety, but erasable ink, such as that sold by the Eink Company, could also be used.

Note that the product subsidy referred to herein is preferably funded at least in part by advertising revenue received from advertising providers 80 (Fig. 1), but an embodiment has been contemplated where the product subsidy is funded at least in part from the distribution revenue received from content providers 50 (Fig. 1). In either case, information (such as statistical information) about what was printed by whom is preferably provided to content providers 50 and/or advertising providers 80 – preferably as a document that is automatically sent to one or more printing devices according to the teachings of this invention.

Other forms of products that are contemplated to be subsidized by this invention include printable media, such as plain paper, specialty paper, transparencies, and the like, and may also include devices 300 such as printing devices, electronic devices, and personal computers. In fact, alternate embodiments have been contemplated where other products, such as a subscription price to a document, or even a product not directly related to the document delivery system shown herein, such as soap or dog food, are subsidized. If block 1800 determines that such a subsidy is warranted, block 1900 requests that distribution module 400 provides such a subsidy to the user. In one embodiment, distribution module 400 simply mails a product such as a print consumable or other product such as the type described above to a user at the address specified in the user profile. In another embodiment, distribution module 400 mails or electronically generates a coupon that the user can use to receive a free or discounted product of the type described above. Regardless of whether block 1800 is answered affirmatively or negatively, flow of control then returns back to block 1300 (Fig. 2) to see if another document has been requested from the printing module 380.

Referring again to Fig. 3, after block 2900 informs document server 100 that the document printed successfully, flow of control moves to block 4100 (Fig. 4), which checks with document server 100 to see what the current version of printing module 380 is. Block 3100 checks to see whether such a request has been received, and when it is, block 3200 sends information concerning the current version of the printing module to printing module 380. Block 4200 compares this information from document server 100 with its own version and determines whether an updated version of printing module is available. For example, if printing module 380 is running version 4.0, and document server 100 indicates that version 4.1 is the current version of printing module 380, block 4200 would determine that an updated version of printing module 380 is available, and flow control would move to block 4300. Block 4300 checks to see whether this updated version of printing module 380 should be requested to be downloaded. While a user would typically be asked whether such a download should be requested or not, and would typically perform this download at a convenient time, such a step could also be performed automatically without user intervention. If such a download is requested, block 4400 is answered affirmatively, and block 3500 downloads the updated printing module, which is then installed in block 4500. Regardless of how blocks 4200 and 4300 are answered, flow of control moves to block 4600, which checks to see if a disconnected state should be entered. If block 2300 (Fig. 2) determined that device 300 was in a disconnected state when the document was requested, as discussed above (i.e., not operatively coupled to network 200), block 4600 is answered affirmatively, and block 4700 reenters the disconnected state. In any event, flow of control returns to block 2200 of Fig. 2.

Referring again to print schedule 390 shown in Fig. 7, it can be seen that many different types of documents can be requested to be printed. For example, the title of document 11000 specifies a network address, such as an Internet uniform resource locator (URL) that contains the network location of a document to be printed. Note that this URL may be partially or completely hidden from the user, as is the case with the URL for document 15000 (<http://www.beloitdailynews.com>). In this scenario, edit module 120 of document server 100 merely goes out to the Internet at the URL indicated (which would be shown in Fig. 1 as one of the content providers 50), and captures the indicated content, which may well be aggregated over a period of time,

formatted and subsequently transmitted to a requesting user, e.g., at a coupled printing device, via transmission module 150 and printing module 380, as has been discussed. Alternatively, device 300 could go directly out to the URL itself without assistance from document server 100; in this case, block 2300 (Fig. 2) requests document 11000 from another source – directly from the content provider 50 (at the indicated URL) via network 200.

In certain instances, described more fully below, edit module 120 periodically receives content on behalf of a requesting user for aggregation and delivery according to a user-defined delivery schedule that differs from a content provider publication schedule. Accordingly, edit module 120 stores the received content for later retrieval, aggregation and formatting into a personalized publication for delivery in accordance with the user defined delivery schedule (e.g., as denoted in the user profile).

In contrast, document 12000 is not a document that originates with a content provider 50 via the Internet, but instead is stored directly on device 300, such as a printing device, personal computer, or other electronic device. An example of such a document could be a daily calendar from a program such as Microsoft Outlook, which the user has requested be printed automatically to his printer, without any user intervention, at 7:00 a.m. every weekday morning. In such an embodiment, printing module 380 does not need to request the document from document server 100, since it can access the documents without going through network 200. In this embodiment, block 2300 of Fig. 2 requests the document from another source – device 300. While block 2900 would still preferably indicate that the document was printed, and while block 1700 would still preferably update the user profile in knowledge module 170, printing such a document would preferably not generate any type of credit towards a product subsidy, since such a document would not be considered a “preferred” document, e.g., not a document under the control of edit module 120.

Referring again to Fig. 7, a print schedule of document 13000 is shown. Document 13000 is referred to as a “personalized document”. A “personalized document” is a document that is assembled by edit module 120 of document server 100 from a variety of content providers 50 and advertising providers 80, based on information contained in the user profile stored in knowledge module 170. For example, document 13000 is a “personalized document”. Our user has requested that

document 13000 – his personalized newspaper – be printed at 6:00 a.m. every day. Edit module 120 examines the user's interests as specified in the user profile stored in knowledge module 170 to assemble the document from selected content providers 50 in which the user has indicated an interest. Edit module 120 also inserts advertising from selected advertising providers 80 – again based on the user profile stored in knowledge module 170.

Fig. 8 shows how the print schedule 390 of Fig. 7 can be edited by the user. The user can use the publisher's recommended schedule, use a default schedule the user has set, or use a custom schedule for delivery. If a custom schedule is selected, the user can select a daily, weekly, or monthly delivery, or select a delivery once every specified number of days, or specify every weekday. In addition, the time of day can also be specified: once at a designated time, multiple times during the day, or multiple times separated by a specified period of time. While not shown here, the user could also edit print schedule 390 to request that a document be sent upon creation, or upon the occurrence of an external event.

Figs. 9A-9B show document 11000 printed by the printing device according to one embodiment of the invention. Note that this document came from one content provider 50 via network 200 (either through document server 100 or directly), and contains no advertising. While document 11000 is preferably formatted by content provider 50 such that the information contained in the document is optimized to be printed, such formatting is not necessary.

Fig. 10 shows document 12000 printed by the printing device according to one embodiment of the invention. Note that this document is a user's daily calendar which came directly from device 300 and not from document server 100 via network 200.

Figs. 11A-D show document 1300 printed by the printing device according to one embodiment of the invention. Note that this document is a user's personalized newspaper which contains information in which the user has indicated a specific interest in, as stored in the user profile in knowledge module 170. Note also that this document contains advertising that edit module 120 determined the user would also be interested in, again based on the information contained in the user profile stored in knowledge module 170. As has already been discussed, when the user prints a



sufficient number of such “preferred” documents, the user may receive a product subsidy of a print consumable or other product(s).

Fig. 12 shows document 14000 printed by the printing device according to one embodiment of the present invention. Note that document 14000 is the HP Instant Delivery Times – a document located on document server 100. While this document does not contain advertising per se, it is still considered to be a “preferred document”, since it is under the control of edit module 120. Document 14000 informs users of Instant Delivery of new releases or new information about the Instant Delivery Program.

#### Aggregated Delivery of Periodic Content

Having introduced an example document delivery system architecture and associated operational methods, above, attention is now drawn to Figs. 14-17, wherein another aspect of the invention is presented. As introduced above, document server 100 solicits and/or receives content from one or more content providers (50, 80) in the generation of personalized publications for requesting users. Typically, to provide the most current information, once the content is received from the content provider(s) (50, 80), it is formatted and delivered to the user. There is content, however, wherein it is not as important that the user receive it while it is “fresh”. Indeed, there are circumstances when it may well be more convenient for the user to receive an aggregate of such content on a periodic basis which differs (e.g., more infrequently) from the publication schedule of the content itself. For example, while comic strips are published on a daily basis, it may be more convenient for certain users to receive an aggregate of such content on a weekly or monthly basis. Thus, in accordance with one aspect of the present invention, document delivery system 10 may well incorporate a content repository (e.g., a storage medium coupled to document server 100) to aggregate periodic content for delivery in accordance with a user-defined delivery schedule. For purposes of illustration, and not limitation, this aspect of the invention will be developed in accordance with the example implementation introduced above, wherein a user wishes to receive a weeks worth of daily content (e.g., the Cathy® comic strip) once a week.

Turning to **Fig. 14**, a flow chart of an example method for delivering aggregate content to a requesting user is presented, according to one aspect of the present invention. In accordance with the illustrated example embodiment of Fig. 14, the method begins with block 16002, wherein document server 100 receives an indication from a user requesting content delivery in accordance with a user-defined schedule. Unlike the implementations introduced above, however, the user wants the content delivered according to a schedule (user-defined schedule) that differs from the publication schedule of the content provider(s) (50, 80). According to one example implementation, edit module 120 of document server 100 receives a request from a user interface (UI) rendered on a computing interface for the user. A graphical illustration of an example UI to generate just such an indication is presented with reference to Fig. 15.

Turning briefly to **Fig. 15**, a graphical illustration of an example user interface enabling a user to schedule aggregate delivery of content is presented, according to one example embodiment. In accordance with the illustrated example embodiment of Fig. 15, a user interface 17000 associated with the select content (e.g., Cathy® comic strip) is presented. According to one implementation, the UI 17000 is presented upon user selection of the content from a catalog of available content. The indication introduced above is sent to, for example, edit module 120, when the user selects the “add delivery” button 17002.

In block 1604, edit module 120 updates a print schedule 390 associated with the user to denote periodic delivery of aggregate of content. More particularly, edit module 120 presents the user with an interface that enables the user to add the content to the delivery schedule, and updates the delivery schedule to reflect the user’s preferences. Just such an interface is presented with reference to Figs. 16A and B.

As shown, **Fig. 16A** and **Fig. 16B** graphically illustrate an example interface to manage a user print schedule, according to one example embodiment. In accordance with the illustrated example implementation of Figs. 16A and B, the user’s delivery schedule 18000 is presented, along with a dialog box 18002 requesting that the user confirm that they wish to add the select content to the delivery schedule. If the user selects the “accept” button of the dialog box 18002, a management interface is presented, which enables the user to define the delivery criteria for the selected

content. An example management interface was presented above, with reference to Fig. 8. As introduced above with reference to Fig. 8, a user can select delivery of content on a schedule that differs from that of the content provider(s) publication schedule. More particularly, by selecting “my default schedule” or the “custom defined schedule” for the delivery of the content, the user can elect to receive an aggregate of the content provider’s serially published content on a schedule that suits their particular situation. In accordance with the illustrated example implementation, perhaps it is more convenient for the user to receive the entire week’s worth of Cathy® comic strips, published daily, on Sunday when they have the time to read the content they so enjoy. If the content were delivered according to the publication schedule, it may go unread if the user does not have the time to review the material, thereby wasting print-related supplies (e.g., paper, ink, etc.). Once the user has defined the delivery criteria for the selected content in the UI of Fig. 8, an updated delivery schedule 18004 is generated, in accordance with the teachings above, to reflect the addition of the aggregate content, block 18006.

Continuing with the flow chart of Fig. 14, once the delivery schedule has been updated to reflect the addition of aggregate content 18006, edit module 120 determines whether new content has been received, block 16006. According to one example implementation, edit module 120 periodically receives content from one or more content providers in accordance with the content providers publication schedule for delivery to requesting users. For those users that wish delivery of the content in accordance with the publication schedule of the content provider (50, 80), the content is prepared for delivery in accordance with Figs. 2-4. For those users that desire delivery of the content on their own schedule, the process continues with block 16008 wherein the new content is stored in a content repository accessible by edit module 120 for subsequent retrieval and delivery by document server 100.

According to one implementation, document server 100 includes a storage device (not shown) which caches pointers to memory locations at the content provider(s), wherein a copy of content that was previously published for serial delivery may be found. It is to be appreciated that by leveraging the storage capability of the content provider(s) (50, 80), which likely retain a copy of published content for a period of time anyway, the storage requirements of the document server

100 are reduced. In an alternate embodiment, document server 100 is coupled to one or more storage devices which receive and maintain a copy of select content from content provider(s) (50, 80) for subsequent retrieval and delivery to requesting users.

- In block 16010, the process continues with edit module 120 determining
- 5 whether it is delivery time for one or more of the content identified in the delivery schedule 18004. If not, document server 100 continues with block 16006. If, in block 16010 edit module determines that it is time to deliver aggregate content, the content is collected from the content repository for delivery, block 16012. In accordance with the illustrated example implementation, the content repository is accessed by edit
- 10 module 120 to retrieve the select content published since the last scheduled delivery. As introduced above, the collection by edit module 120 may involve issuing requests to memory of the content provider(s) for content stored at memory locations denoted by the one or more pointers retrieved from the repository. Alternatively, the edit module 120 retrieves the actual content from local storage for delivery to the user.
- 15 According to one implementation, edit module 120 formats the aggregate content, in accordance with user preferences, to denote when the content was originally published. In accordance with the example implementation, edit module 120 formats a publication with a weeks-worth of Cathy® comic strips, wherein each daily strip is specifically denoted.
- 20 In block 16014, the personalized publication comprising the aggregated content is delivered to the requesting user. An example of just such a personalized publication is presented with reference to Fig. 17, according to the example implementation introduced above.

- Fig. 17** illustrates an example publication of aggregated content, according to
- 25 one embodiment of the present invention. In accordance with the illustrated example implementation of Fig. 17, a personalized publication comprising a weeks worth of Cathy® comic strips is generated for periodic delivery to the user, in accordance with the user delivery schedule 18004. As introduced above, edit module 120 may format the personalized publication 19000 to denote when the content was originally
- 30 published (e.g., the day of the week, the date, etc.). Thus, in accordance with the illustrated example implementation, edit module 120 formats the personalized